



**AN APPROACH TO OVERCOME DELAYING MOBILITY DISABILITY IN PEOPLE WITH PARKINSON'S
DISEASE USING SENSORY MOTOR AGILITY EXERCISE PROGRAM**

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CHAPTER I

INTRODUCTION

1.1. INTRODUCTION

Nervous system is the chief controlling and co-ordinating system of the body. Brain is the major organ of the central nervous system controlling body's Voluntary and involuntary activities.

Parkinson's disease is a degeneration disorder of the central nervous system.

Parkinson's is the group of disorders that produce the abnormalities of basal ganglia characterized by rigidity, brady kinesia, freezing, poor sensory integration, and inflexible programme solution (**Laurie A king 2009 AJPT**)

Basal ganglia play an important role in the planning and programming of movement by solving and inhibiting specific motor synopsis. Motor programme are consolidated into efficient goal direct motor plan, translating through into a willed movement – and regulating levels of activity muscle tone, muscle force.

It also plays a role in cognitive process such as awareness of body orientation, ability to adopt behavior as task requirements change and motivation. Pathophysiologically Parkinson's is associated with degeneration of dopaminergic neuron that produces the dopamine. Clinically Parkinson's is classified into two groups.

Group 1 includes dominant symptoms such as postural instability and gait disturbance, second group includes tremor as the main feature and bradykinesia (**Thomas Ischmitz 1997**).

As the strategically view construction the study introduces an approach to develop an exercise programme to delay mobility disability in people with Parkinson's

disease. Mobility is defined as the ability to efficient navigate and function in the variety of environment that required balance ability and flexibility.

Constraint on mobility specific to Parkinson's disease such a rigidity, bradykinesia, freezing, poor sensory integration, inflexible programme solution and nobilities, in Parkinson's affected patient. Thus my study conceptual a frame work for exercise to maintain and improve the mobility which as encountered by above constraint.

The constraint focused the agility exercise programme incorporation movement principle from tai chi, kayaking, boxing, lunges, agility exercise training and Pilates exercise presented. The constraint focused agility exercise programme is based on a strong scientific frame work and includes progressive level of sensory motor, resistance, and coordination challenges that can be customized for each patient while maintain fidelity, principles for improving mobility presented here can be incorporated into an ongoing or long term exercise programme for people with Parkinson's disease (**Fay B Horak 2009 APTA**).

Task – specific exercise targeted at a single, specific balance or gait impairment in patients with parkinson's disease have been shown to be effective. Exercise rargetted improving small step size, poor axial mobility, difficulty with postural transitions, small movement amplitude, or slow speed of compensatory stepping have individually been shown to be effective in improving each particular aspect of mobility, singular techniques from several successful programs and components of mobility and systematic sensory motor challenges into a comprehensive exercise program directed at delaying and reducing mobility problems in individuals with parkinson's disease.

Reduce mobility constraints with exercise, people with mild or newly diagnosed parkinson's disease often do not have obvious muscle weakness or poor balance. Nevertheless, that muscle weakness, secondary to abnormal muscle

activation associated with bradykinesia and rigidity can be present at all stages of parkinson's disease. Similarly, balance and mobility problems may be present in people with mild parkinson's disease but only become apparent when more complex coordination is required under challenging conditions. As the disease progresses, balance problems become more apparent, just as patients begin to show impaired kinesthesia and in ability to quickly change postural strategies. The basal ganglia affect balance and gait by contributing to automaticity, self-initiated gait and postural transitions, changing motor programs quickly, sequencing action, and using proprioceptive information for kinesthesia and multi segmental coordination. During the progression of parkinson's disease, mobility is progressively constrained by rigidity, bradykinesia, freezing, sensory integration, inflexible motor program selection and attention and cognition.

1.2 NEED FOR THE STUDY

This study introduce a new frame work for physiotherapist to develop a exercise programme to delay mobility disability in people using with Parkinson's disease.

This study constraint focused agility exercise programme is based on a strong scientific framework and includes progressive levels of sensory motor, resistance, and coordination challenges that can be customized for each patient while maintain fidelity. Principle for improving mobility presented here can be incorporated into an ongoing or long term exercise programme for people with Parkinson's disease. There are less research concerning these aspects so my aim was to study a research on this concern.

1.3 AIM AND OBJECTIVE OF THE STUDY

AIM OF THE STUDY

Aim of my study is to overcome delaying mobility disability in people with Parkinson disease using sensory motor agility exercise programme.

OBJECTIVE OF THE STUDY

To determine the effect of sensory motor agility exercise programme on delaying mobility disability in people with Parkinson's disease.

1.4 HYPOTHESIS

NULL HYPOTHESIS

There is no significant improvement in delaying mobility disability in people with Parkinson's disease using sensory motor agility exercise programme.

ALTERNATE HYPOTHESIS

There is significant improvement in delaying mobility disability in people Parkinson's disease using sensory motor agility exercise programme.

1.5. OPERATIONAL DEFINITIONS

Parkinson's Disease

Parkinson's is a group of disorders that produce the abnormalities of basal ganglia characterized by the cardinal features such as rigidity, bradykinesia, tremor, postural instability, freezing and impaired cognitive processing.

Susan O'sullivan et al.,

Parkinson is associated with degeneration of dopaminergic neurons which produce dopamine.

Thomas J Schmitz et al., 1997

Agility Exercise

He suggests a new framework for therapists to develop an exercise programme to delay mobility disability in people with Parkinson's disease. Mobility or the ability to efficiently negotiate and function in a variety of environments requires balance, agility, flexibility, all of which are affected by Parkinson's disease.

Laurie A King et al.,

He suggested a task-specific agility training programme results in larger improvement in motor skill as well as larger changes in synaptic plasticity than simple repetitive aerobic training such as running on treadmills.

Fay B Horak et al.,

Berg Balance Scale

Berg balance scale is an objective measure of static and dynamic balance ability that is in normal human beings as well as neurological condition patients. Scale consists of 14 functional tasks commonly performed in everyday life and accounts for a maximum score of 56 points.

Berg et al., 1987

Timed up and go test

He developed a get up and go test is a quick measurement of dynamic balance and mobility.

Mathias et al.

CHAPTER II

REVIEW OF LITERATURE

Stephanie Combs., et al 2010

He focused on boxing agility exercise programme participating boxing training session may help improve muscle and neurological functioning in patients with Parkinson's disease. He investigated the effects and 12 to 36 weeks of regular boxing training on individuals both Parkinson's. The result found and saw short, long-term improvement in balance, gait activities of daily living and improvement in quality of life.

King & Horak., et al 2009

Recently developed an exercise program with the aim of delaying the progressive loss of mobility associated with balance and gait disorders in individuals with Parkinson's disease. Movements used in techniques such as "Tai Chi" and pilates combined in order to facilitate sensory integration in postural control, somatic sensory information encouraged by large and co-ordinated movements in order to move center of mass with speed safety and balance.

LA king et al., 2009.

Demonstrates an exercise programme to delay mobility disability in people with Parkinson's disease. He identified the constraint on mobility specific to Parkinson's disease. He focuses on anticipated problems, which are inevitable with progression of the disease. He treated the patients with agility exercise and showed significant improvement in balance.

Cynthia L comelia et al., 2009

He studied in a randomized, single – blind, cross over study and evaluated physical disability is moderately advanced in Parkinson's disease patients after 4 weeks of normal physical activity and 4 week of an intensive physical rehabilitation programme. He used a timed motor task and standard assessment of balance using Berg balance scale.

Canning et al., 2009

He explained the physiology working on involving gain of muscular strength and balance in patients with Parkinson's disease. He mentioned that postural control in Parkinson's disease must be worked through exercise involving both somatosensory and musculoskeletal system and hence patients were able to respond to sudden center of perturbations inherent in daily activities.

Hirsch and Farley et al., 2009

He emphasized on treating the balance disorder patients with agility exercise program and giving dual-task training. This makes the patient to maintain flexibility and makes very active by walking and hiking. This keeps the patient Physically active and makes him to do his activity of daily living by himself and promotes better achievement in his quality of life.

FB Horak et al, 2008

He studied that major cause of disability in people with Parkinson disease is impaired mobility and balance. He defined mobility is the ability of a person to move safely in a variety of environments in order to accomplish functional tasks, requires dynamic neural control to quickly and effectively adapt locomotion, balance and postural transition to changing environmental and task conditions.

Weintraub et al., 2008

Describes that Parkinson's disease is a chronic neurodegenerative disease with major impact on patients live and in the society as a whole. Neurochemically, Parkinson's disease is characterized by an imbalance in the dopaminergic pathway which connects the substantia nigra to the striatum. The deficit in dopamine is due to progressive loss of neurons in midbrain's substantia nigra with in the neural conduction.

Nancy Brown – Toms et al., 2008

Evaluated the effectiveness of a personalized home programme of exercise and strategies for repeat fallers with Parkinson's diseases. He concluded that there was a trend towards a reduction in fall events and injuries falls with a positive effect of exercise on new falls and quality of Life. Parkinson's disease clinical presentation vary between individual the exercise programme focuser on there characterized.

Vaugoyeau et al., 2008

Demonstrated that an increased tonus of the body axis in individuals with Parkinson's disease result in "en bloc" axial movement and disturb execution of important activities such as movement in bed and turning while walking emphasized exercise for axial mobility which was associated with muscle relaxation with diaphragmatic breathing to increase Range of motion of neck and trunk.

Halkney and Earhard et al., 2008

Showed that individuals with Parkinson's disease practicing "Tai Chi" for 13 weeks with other agility exercise achieved gains in balance and functional performance. When compared to control group without intervention. Thus agility excise is a safe and beneficial exercise in the treatment of moderately to severity attached Parkinson's disease patients. He showed significant improvement in balance and mobility.

C renner, et al,2008

Demonstrated agility exercise programme as an effective balance training in patient with Parkinson's disease. He highlighted the importance of intensity and suggested that Parkinson's disease patients can undergo the exercise without any contraindication. It also improves the muscular strength and gait orders in Parkinson's disease patients and considered an effective protocol in treating the patients.

Ashburn et al., 2008

He have shown that exercise can restore motor function through a variety of molecular repair mechanisms in the basal ganglia circuit affected by Parkinson's disease. He executed the study for 30 days at a frequency of 2 times a day. The result showed significant improvement in motor performance and improvement in gait and balance, short shuffling gait's speed is improved typically using agility exercise.

Tillerson et al., 2008

Demonstrated compensatory therapies in accordance with Medications. He had a fundamental component of an overall therapy plan, but adding in different types of exercise provides a much greater benefits to patient with Parkinson's disease. Progression differs from patient to patient and hence he altered the training programme according to the patients need and proved improvement in balance and gait.

Howells et al.,2007

He emphasized dancing as a part of agility exercise program. Dancing is an aerobic activity that pairs balance and co- ordination both control and creativity. Dancing is also and low impact exercise and is considered safe for Parkinson's

disease patients. Argentine tango was recently found to effectively improve balance and co-ordination in Parkinson's patients.

Pallone et al., 2007

Studied that tremor occurs in absence of voluntary movement. He found it to be common initial symptom found in the Parkinson's disease and involves the thumb and wrist. He aimed at preserving patient's independence and quality of Life. Specific exercises were designed to improve mobility and balance.

Regular exercise practice improves physical and functional performance in patient with Parkinson's disease.

Barbalek et al., 2007

He observed agility exercise program improve functional performance in individuals with Parkinson's disease. Task-specific training improved balance and gait and improves walking speed and maintains that gains at six months significant improvement there achieved with this new training programme and improve cardiovascular fitness also in patients with Parkinson's disease.

Petzing et al., 2007

Berg balance scale is used to measure balance in patients with cerebellar dysfunction Parkinson's disease is also activated by basal ganglia in which balance and gait is mainly affected. The scale score 56 and measure the functional task in various surface altering the base of support and speed enhancing balance. This is most valid and effective scale in measuring the balance and co-ordination especially in balance disorder patients.

Jasper E. Visser., et al 2004

He studied falls and freezing of gait are two “episodic” phenomena that are common in parkinson’s disease, summarise recover insights into falls and freezing of gait and highlight their similarities, difference links.

Inkster et al., 2003

His recent studies have shown that muscular strength is reduced in Parkinson’s patients. When compared to other individual. He believed that central mechanism may be responsible through the reduction of facilitative stimulus for motor neurons. Agility exercise program is very effective and shows better recovery in the patient.

Roberta Marchese, et. al., 2003

He studied the effect of concomitant cognitive or motor task performance control in parkinson’s disease, he performed postural sway was measured with eyes open and eyes closed during quiet stance and during performance of calculation or motor sequence or thumb opposition, this study demonstrated dual task interference on postural control can be observed in parkinson’s disease patients during performance of cognitive as well as motor tasks.

Toole et al., 2000

Showed greater gains in muscular strength and balance when individuals with Parkinson’s disease underwent a combined protocol of strength, better performance in balance and permanent of gain after 4 week of his treatment session. He elicited permanent non-hypertrophic muscle adaptations favoring maintains of effect after 1 month of intervention in his study.

Stanley Fahn., et al

Parkinson's disease symptoms is common in freezing but different causes of Parkinson's disease with other symptoms has never been investigated. Freezing was found in a high frequency in patients with vascular parkinsonism, normal-pressure hydrocephalus and generally parkinson's resulting neurodegenerative disease. Freezing was significantly associated with the presence of dementia, incontinence, and tachypnea.

Williams A., et al

Frequent falls and risk of injury are evident in individuals with parkinson's disease progresses. There have been no reports of any interventions that reduce the falls in idiopathic parkinson's disease. Gait and step perturbation training resulted in a reduction in falls and improvements in gait and dynamic balance.

Kwakkel G., et al

He studied rehabilitation exercise therapy in patients with parkinson's disease, to improve gait and gait related activities in parkinson's disease because naturally combines cognitive movement strategies, cueing techniques, balance exercise while focusing the current mobility limitation of the patients. Significant were found for the Berg balance scale and, timed up and go test.

CHAPTER III

3. MATERIALS AND METHODOLOGY

3.1 MATERIALS

- Table, chair with arm support
- Scale
- Inch tape
- Stool
- Grading scale with assessment sheet

3.2 METHODOLOGY

3.2.1 STUDY DESIGN

The study was an experimental study design with pretest and post test evaluation both in experimental and control group.

3.2.2. SAMPLING DESIGN

The subject are selected by non-probability purposive sampling techniques.

3.2.3 POPULATIONS

The sample size consist of 20 subjects with Parkinson's disease were selected and assigned in to group A experimental and group B control group.

Experimental group

Consist of 10 Parkinson's disease subject treated with sensory Motor Agility exercise programme.

Control group:

Consist of 10 Parkinson's diseased subject treated with medications and general gait training programme.

3.2.4 SAMPLE

20 subjects were included in the study.

3.2.5 SELECTION CRITERIA**3.2.5.1 Inclusion Criteria:**

- Both males and females.
- Patient with Parkinson's disease.
- Patient with normal sensation in extremities.
- Age above 60 years

3.2.5.2. Exclusion Criteria

- Loss of sensation.
- Usage of orthotic device.
- Brain tumor
- Patient with cerebellar dysfunction
- Traumatic brain injury
- Visual problems
- Musculoskeletal injuries.

3.2.6. STUDY SETTING

This is proposed to be carried out in the Ashwin multispecialty hospital Coimbatore.

3.2.7 STUDY METHOD

Subjects were divided into control group of experimental group.

Experimental Group

10 parkinson's disease Subjects were treated with sensorimotor agility exercise program.

Control group

10 parkinson's disease subjects were treated with general gait training program.

3.2.8 STUDY DURATION

The study is proposed to be carried out for the period of 6 months.

3.2.9. TREATMENT DURATION

The study was done for 16 weeks for each parkinson's disease subject receiving 4 sessions per week.

3.2.10 PARAMETER

- Berg balance scale.
- Timed up and Go test.

3.2.11 STUDY PROCEDURE

Written constraint was being obtained from the patient. Each patient will undergo formal evaluation of inclusion in to the study. Before starting the treatment there complete procedure was explained to the patients.

Subjects were advised not to under go any other exercise on treatment during the study period.

At the beginning with the study the patients balance was measured by Berg balance scale. Timed up with go test. The sample were collected randomly.

So patients were randomly assigned into two groups the study population included only those met the inclusive criteria.

20 parkinson's disease subjects were divided into 2 groups.

Experimental Group:

Consist of 10 Parkinson's disease subjects treated with agility exercise programme.

Control Group:

Consist of 10 Parkinson's disease subjects treated with general gait training programme.

Both group were undergone pretest were the patient under experimental group (Group A) are treated for 20-30 minutes in alternate days 4 times per week for 16 week and was supervised by the physiotherapist the patient will undergo initial 5 minutes with general warm up exercise. The patient under control group (Group B) were treated with gait training programme.

Subjects were advised not to undergo any other exercise on treatment during the study period were supervised by the physiotherapist.

Data collected on the first day of treatment and also end of the treatment. Both groups underwent pretest and post test assessments at regular intervals.

Assessment was performed immediately after 16 weeks of study period with measured using Berg balance scale and timed up and go test.

3.2.12. STATISTICAL TOOLS

Paired 't' -test.

The intra group analysis of results were done with paired 't' test with 5% level of significance. Statistical analysis is done by using dependent 't' test.

$$t = \frac{\bar{d}\sqrt{n}}{S}$$

$$S = \sqrt{\frac{\sum d^2 - \frac{(\sum d)^2}{n}}{n-1}}$$

\bar{d} = Difference between the pretest and post test.

\bar{d} = Mean deference

n = Number of observations

s = Standard deviation.

To compare control group and experimental group.

Statistical analysis is done by using independence 't' test.

$$t = \frac{\bar{X}_1 - \bar{X}_2}{S} \sqrt{\frac{n_1 n_2}{(n_1 + n_2)}}$$

$$S = \sqrt{\frac{\sum (x_1 - \bar{x}_1)^2 + \sum (x_2 - \bar{x}_2)^2}{n_1 + n_2 - 2}}$$

Where,

s = combined standard deviation.

\bar{X}_1 = mean of control group

\bar{X}_2 = Mean of experimental group

n_1 = No of patients in control group

n_2 = No of patient in experimental group.

3.2.13 TREATMENT TECHNIQUES

- General warm up exercise are given for 5 minutes.
- Test specific agility training programme done in phases.
- The agility course includes turns, doorways, hallways and small areas. The tasks include Right knees walking with hand touching knees, Lateral shuffle, tire course and grapevine cross.
- If patient is able to do further proceed with agility on inclined surfaces and bouncing or tossing a ball. Dual task program is given along with this for cognitive impairment correction.
- Along with this includes tai chi, Kayaking, Boxing, Lunges and pre-Pilates are done.
- Taichi – prayer wheel, cat walk, cloud hands
- Kayaking – Kayaking stroke
- Boxing – Jab, cross, Hook
- Lunges – Postural correction, single multi directional steps
- Pre-pilates – cervical range of motion, supine (bridging), rolling (prone lying), quadruped (cat-camel, dog), half-kneeling to stand.

Balance is measured using berg balance scale and Timed up and go test.

CHAPTER IV **DATA PRESENTATION**

TABLE –I
EXPERIMENTAL GROUP (GROUP - A)

S.NO	BALANCE WITH BERG BALANCE SCALE		MOBILITY WITH TIMED UP AND GO TEST	
	Pre test	Post test	Pretest	Post test
1	20	25	32	22
2	24	30	35	20
3	28	35	37	30
4	27	34	40	28
5	23	31	42	35
6	21	28	33	25
7	25	33	36	26
8	29	34	38	30
9	30	37	41	35
10	19	24	39	28

TABLE –II
CONTROL GROUP (GROUP - B)

S.NO	BALANCE WITH BERG BALANCE SCALE		MOBILITY WITH TIMED UP AND GO TEST	
	Pre test	Post test	Pretest	Post test
1	20	21	35	30
2	19	21	40	38
3	28	30	45	43
4	27	30	46	43
5	21	21	42	40
6	18	19	33	30
7	17	20	32	28
8	22	23	36	30
9	24	26	38	34
10	23	25	39	32

CHAPTER V

DATA ANALYSIS AND INTERPRETATION

TABLE – III

PRE AND POST VALUES OF BALANCE IN EXPERIMENTAL GROUP

S.NO	GROUP	MEAN	MEAN DIFFERENCE	S.D. VALUE	'T' VALUE
1.	Pre Test	24.6	6.5	0.3928	20.162
2.	Post Test	31.1			

For 9 degrees of freedom at 5% level of significance, the calculated pretest and post test 't' values between control and experimental group in Balance was 20.169 is the critical values was 2.262 which state that there is significant difference between the groups.

GRAPH -I

COMPARISON OF PRE TEST AND POST TEST MEAN VALUES OF BALANCE IN EXPERIMENTAL GROUP

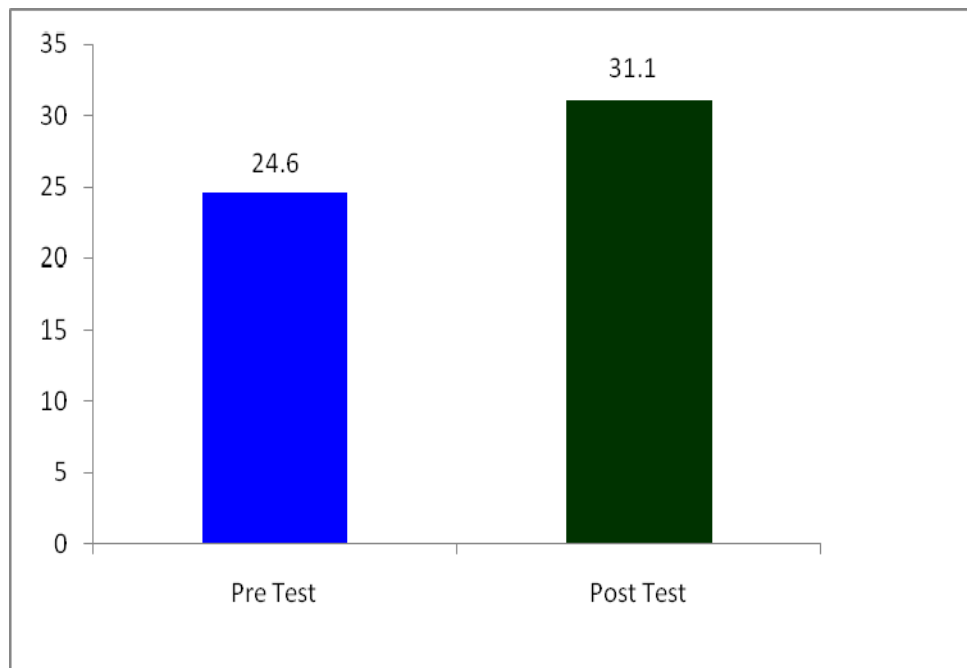


TABLE – IV

PRETEST AND POST TEST VALUES OF BALANCE IN CONTROL GROUP

S.NO	GROUP	MEAN	MEAN DIFFERENCE	S.D. VALUE	‘T’ VALUE
1.	Pre test	21.9	1.7	0.3162	17.0014
2.	Post test	23.6			

For 9 degrees of freedom at 5% level of significance, the calculated pre test and post test values between control a group in balance was 17.0014 and the critical values was 2.262 which state that there exists a significant difference between the groups.

GRAPH -II

COMPARISON OF PRE TEST AND POST TEST MEAN VALUES OF BALANCE IN CONTROL GROUP

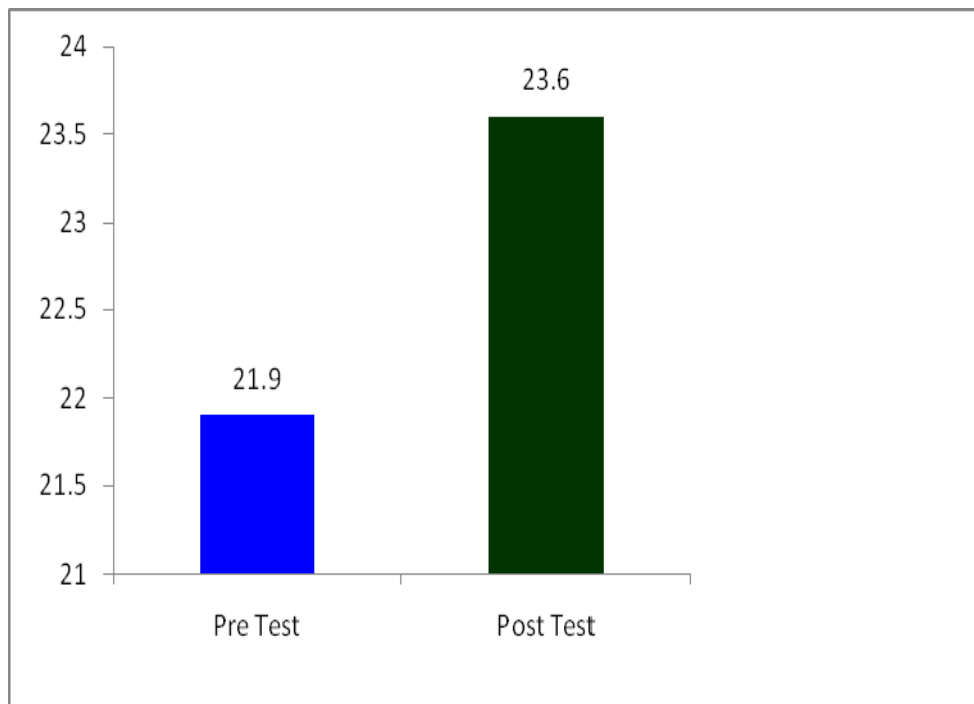


TABLE – V

**POST TEST VALUES OF BALANCE BETWEEN EXPERIMENTAL AND
CONTROL GROUP**

S.NO	GROUP	MEAN	MEAN DIFFERENCE	S.D. VALUE	‘T’ VALUE
1.	Experimental Group (A)	31.1	7.5	4.1719	4.0198
2.	Control Group (B)	23.6			

For 18 degrees of freedom at 5% level of significance, the calculated post test ‘t’ values between control and experimental group in Balance was 4.0198 and the critical values was 2.101 which state that there is significant difference between 2 groups.

GRAPH -III

**COMPARISON OF POST TEST MEAN VALUES OF BALANCE BETWEEN
EXPERIMENTAL AND CONTROL GROUP
IN BERG BALANCE SCALE**

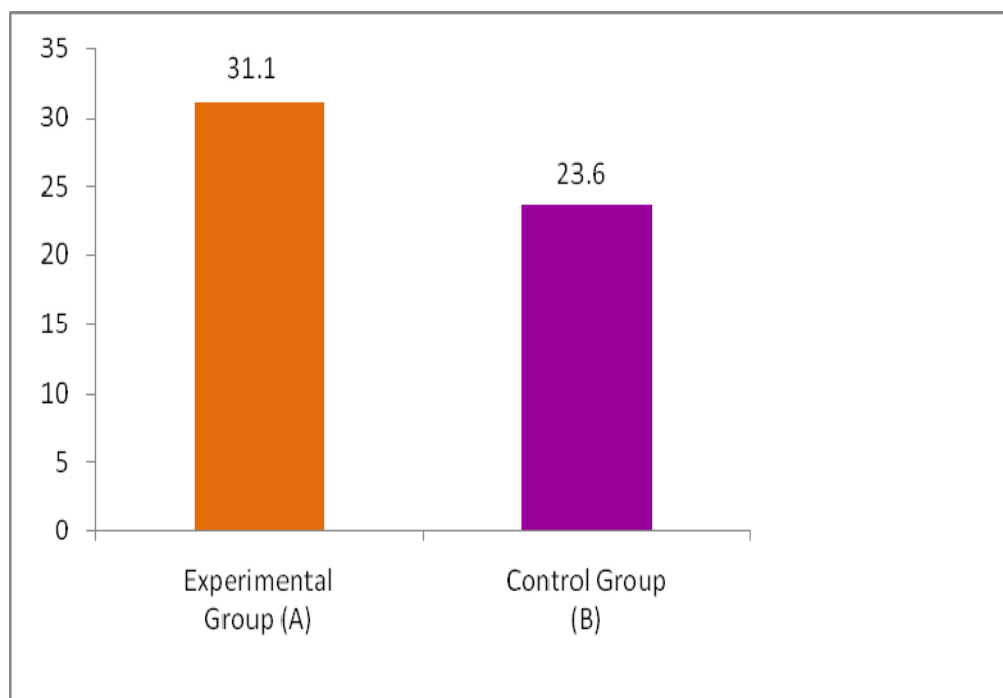


TABLE – VI

**PRETEST AND POST TEST VALUES OF MOBILITY IN EXPERIMENTAL
GROUP**

S.NO	GROUP	MEAN	MEAN DIFFERENCE	S.D. VALUE	‘T’ VALUE
1.	Pre test	37.3	9.4	0.9189	32.348
2.	Post test	27.9			

For 9 degrees of freedom at 5% level of significance, the calculated pre test and post test values of experimental group in mobility was 32.348 and the critical values was 2.262 which state that there exists a significant difference between the groups.

GRAPH -IV

COMPARISON OF PRE TEST AND POST TEST MEAN VALUES OF MOBILITY IN EXPERIMENTAL GROUP

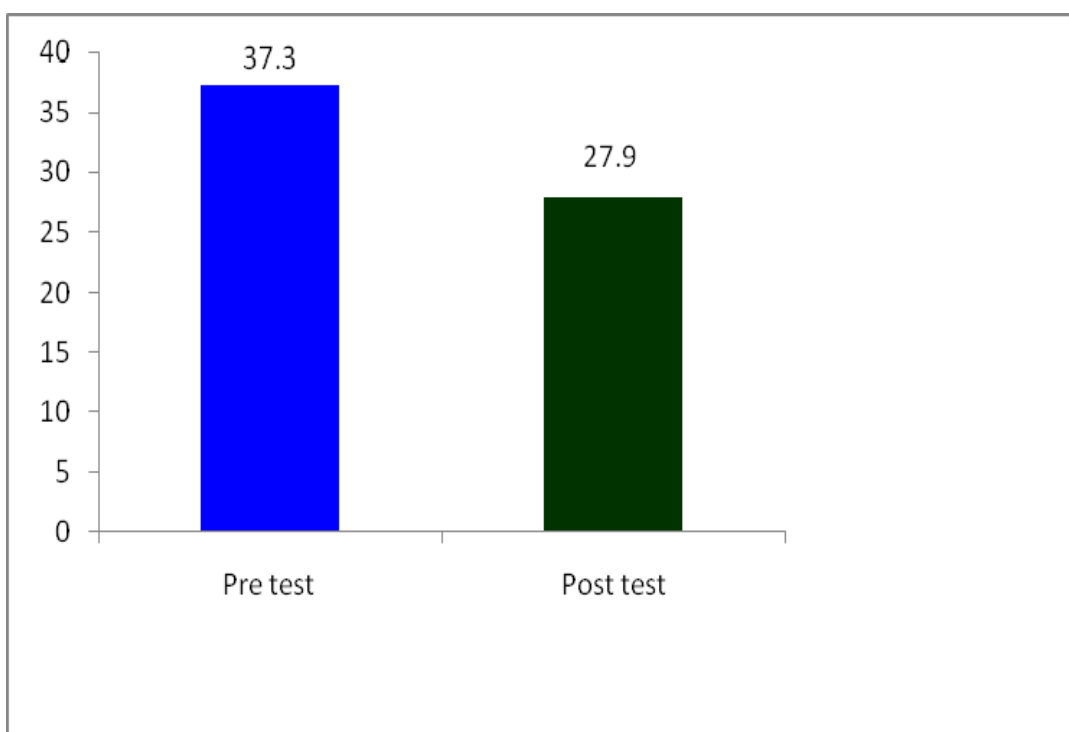


TABLE – VII

PRETEST AND POST TEST VALUES OF MOBILITY IN CONTROL GROUP

S.NO	GROUP	MEAN	MEAN DIFFERENCE	S.D. VALUE	‘T’ VALUE
1.	Pre test	38.6	3.8	0.5837	20.587
2.	Post test	34.8			

For 9 degrees of freedom at 5% level of significance, the calculated pre test and post test values between control a group in balance was 20.587 and the critical values was 2.262 which state that there exists a significant difference between the groups.

GRAPH – V

COMPARISON OF PRE TEST AND POST TEST MEAN VALUES OF MOBILITY IN CONYTOL GROUP

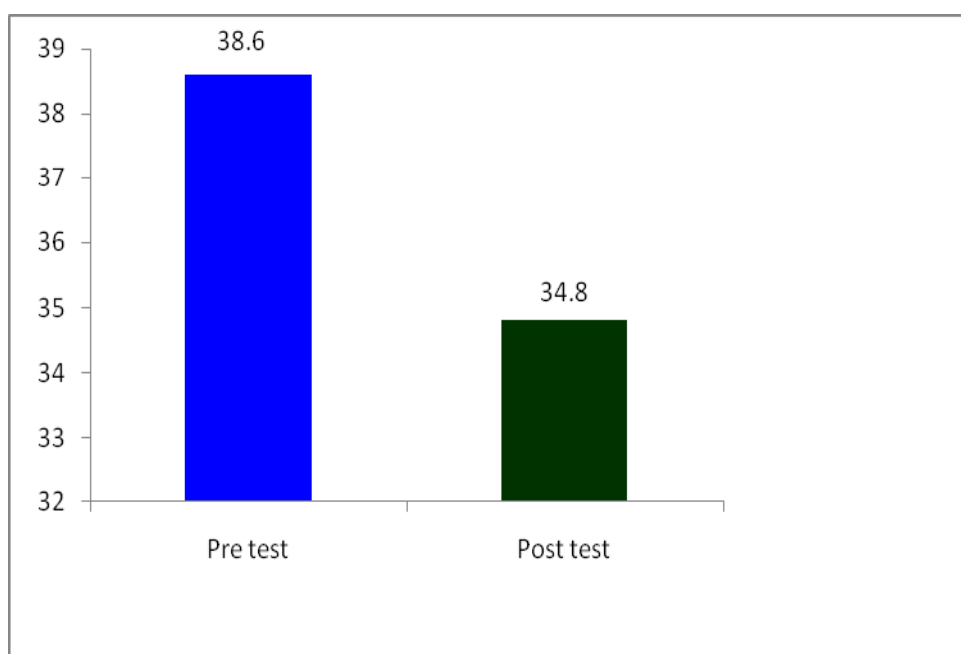


TABLE – VIII

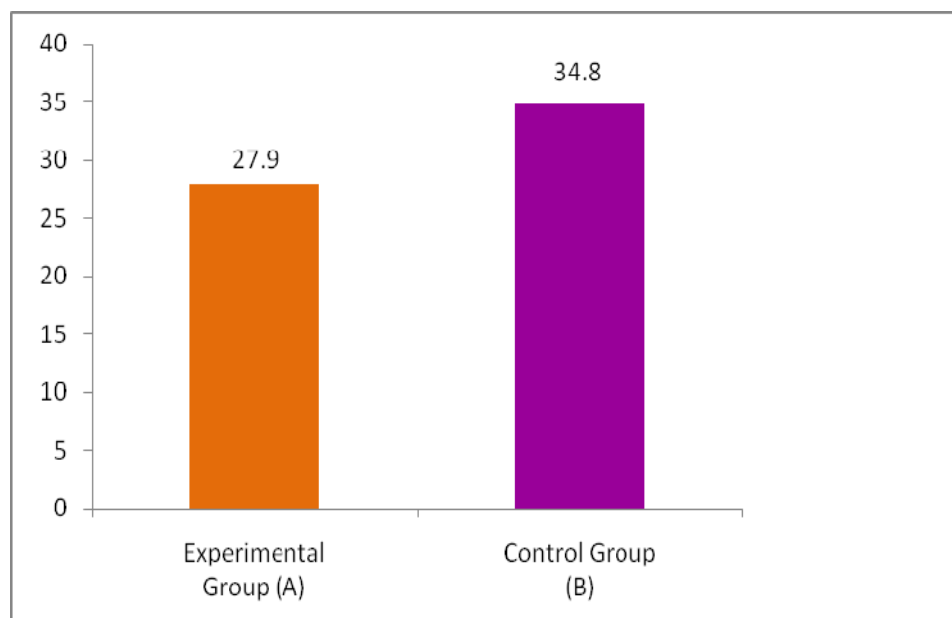
**POST TEST VALUES OF MOBILITY BETWEEN EXPERIMENTAL AND
CONTROL GROUP**

S.NO	GROUP	MEAN	MEAN DIFFERENCE	S.D. VALUE	‘T’ VALUE
1.	Experimental Group (A)	27.9	6.9	5.346	2.8868
2.	Control Group (B)	34.8			

For 18 degrees of freedom at 5% level of significance, the calculated post test ‘t’ values between control and experimental group in Balance was 2.8868 and the critical values was 2.101 which state that there is significant difference between 2 groups.

GRAPH – VI

**COMPARISON OF POST TEST MEAN VALUES OF MOBILITY BETWEEN
EXPERIMENTAL AND CONTROL GROUP IN TIMED UP AND GO TEST**



CHAPTER – VI

RESULTS

Effectiveness of control group was measured by comparing pre test and post test values in mobility and balance. The calculated 't' values is greater than the critical value 2.262 which status the there is significant difference in between the groups.

Effectiveness of experimental group was measured by comparing pre test and post test values in mobility and balance. The calculated 't' is greater than value 2.262 which status that there is significant difference in between the groups.

By comparing the 't' values of experimental and control group 't' values of experimental group is greater than 't' values of control group which status that there exists a significant different in improvement between two groups.

Parkinson's disease is a major neurological disorder and the management various from one stage to another. This study focuses on improving the balance and delaying agility mobility by using agility exercise.

The technique used was agility exercise training program which improves balance and mobility. Statistical significance of 5% level of significance in this study statues that there exists a significant improvement in mobility and balance by using berg balance scale and timed up and go test.

CHAPTER – VII

DISCUSSION

Parkinson's disease is a degeneration disorder of the central nervous system. It is a group of disorders that produce abnormalities of basal ganglia characterized by rigidity, bradykinesia, freezing, poor sensory integration and inflexible programme solution.

The results of this study could yield great understanding of new techniques performed as a part of rehabilitation program for the patients with Parkinson's disease.

Group A (10 Parkinson's disease subjects) who fulfill the inclusive criteria received sensory motor agility exercise program.

Group B (10 Parkinson's disease subjects) who fulfill the inclusive received the traditional balance training. The results were analysed using 't' tests. The results showed that there is significant improvement in balance and mobility using agility exercise programme.

An exercise program to delay mobility disability in people with Parkinson's disease is identified. The constraint on mobility specific to diseased LA King et al.,. That major progression of disability in people with Parkinson disease is impaired mobility and balance. Mobility is the ability of a person to move safely in a variety of environments in order to accomplish functional tasks, requires dynamic neural control to quietly and effectively adapt loco motion, balance and postural transition to changing environmental and task conditions (**FB Horak et al.**).

Thus this study proves that sensory motor agility exercise program improves balance and mobility in people with Parkinson's disease. Statistical analysis is also evidenced for significant improvement.

CHAPTER –VIII

SUMMARY AND CONCLUSION

SUMMARY

The Study was concluded in Aswin multispecialty hospital, Coimbatore. 20 subjects were selected based on inclusion criteria and they were assigned randomly into two groups, both of experimented type. Group A was given sensory motor agility exercise program, and Group B was given general gait training program. Experimental group agility exercise training program which improves balance and mobility. statistical significance of 5 % level of signature in this study statues that there exist a significant improvement in mobility and balance by using berg balance scale and timed up and go test.

CONCLUSION

The pretest and post test scores are noted and analysis was done using independent 't' test which favoured the alternate hypothesis.

The statistical analysis shows there is significant improvement in mobility and balance and shows better recovery in patients with Parkinson's disease.

he study concludes that using sensory motor agility exercise programme in parkinson's disease will over come delaying mobility disability. Thus this study accepts the alternate hypothesis and rejects the null hypothesis.

CHAPTER – IX

LIMITATIONS AND SUGESTIONS

LIMITATIONS

The period of time allotted for the study was found to be insufficient for the inclusion of greater number of subjects. The time allotted for the study per day can be increase to go prognosis.

- Influence of drug, nutritional, psychological state and climate cannot be controlled.
- Study focuses on patients in improvement of mobility and balance further study can be done for gait training.
- Patients were not instructed for home exercise program. Study can be done with prescribing home exercises.

SUGGESTIONS

- Though berg balance scale and Time up and go test were admited as possible.
- The time allotted for the study per day can be increased to get better program.
- My study was done without follow up further study can be done with follow up program can we include to know the long form of treatment.
- Small study (20 subjects) were only used is my study. Study with more number of patients in recommended.

CHAPTER X

BIBLIOGRAPHY

1. Morris ME; *phys Ther*: Page 587-597, 2000.
2. Shumway-cook A, Woolacott M; *Motor control: Theory and practical Applications*: 1995.
3. Rowell LB, shepherd JR; *Exercise: regulation and Integration of Multiple systems*: P.255-292, 1996.
4. Bloem Br, Van Vugt JP; *Advance Neurology*: P.209-223, 2001.
5. Van Praag H, Kempermann G; *Natural Neuro science*: P. 266-270, 1999.
6. Tillerson JL; *Neuro Science*: P.6790-6799, 2002.
7. Herman T, Giladi N; *Arch phys Medical Rehabilittion*: P.1154-1158, 2007.
8. Arguej; *Parkinson's disease and Art of moving*: 2000.
9. Cianci H; *parkinson's disease: Fitness counts*. 3rd Edition: 2006.
10. Zid D; *Delay the disease: Exercise and parkinson's disease*: 2007.
11. Palmer SS, Mortimer JA; *Arch phys medical Rehabilitation*: P.741-745, 1986.
12. Protas EJ, Mitchell K; *Neuro Rehabilitation*: P.183-190, 2005.
13. Schmidt RA; *Motor control and learning: A behavioural emphasis*: 1982.

14. Corcos DM, chen CM; *Ann Neural*: P.79-88, 1996.
15. Maschke M, Gomez CM; *Brain*: P.2312-2322, 2003.
16. Brown P, Marsden CD; *Lancet*: P.1801-1804, 1998.
17. Wright WG, Gurfinkel VS, Nutt JG; *Exp Neurology*: P.38-46, 2007.
18. King LA, Horak FB; *Arch Phys Medical Rehabilitation* P.492-499, 2008.
19. Rocchi L, Chiari L, Mancini M; *Neuroscience Let*; P.128-132, 2006.
20. Yanagawa S, ShindoM; *Muscular weakness in parkinson's disease*: 1990.

CHAPTER – XI

REFERENCES

1. Wood BH, Bilclough JA, Bowron A, 2002. “*Incidence and prediction of falls in parkinson’s disease: a prospective multidisciplinary study*”. *J Neurol Neurosurg psychiatry*. P.721-725.
2. Patla AE, shumway-cook A, 1998. “*Dimension of mobility: defining the complexity and difficulty associated with community mobility*”. *J Aging phys act*. P. 7-19
3. Schenkman M, cutson TM, 1998. “*Exercise to improve spinal flexibility and function for people with parkinson’s disease: a randomized control trial*”. *J am Geriatr soc*. P. 1207-1216.
4. Ashburn A. Fazakarley1, 2007. “*A randomized controlled trial of a home based exercise programme to deduce the risk of falling among people with parkinson’s disease. J Neural Neurosurg psychiatry*”. P.678-684.
5. Isaacs KR, Anderson BJ, 1992. “*Exercise and the brain: angiogenesis in the adult rat cerebellum after vigorous physical activity and motor skill learning. J cereb blood flow metab*”. P. 110-119.
6. Jobges M, Heuschkel G, 2004. “*Repetitive training of compensatory steps: a therapeutic approach for postural instability in parkinson’s disease*”. *J neurol Neurosurg psychiatry*. P. 1682-1687.

7. Wierzbicka MM, wiegner AW, 1991. "*Abnormal most-rapid isometric contraction in patients with parkinson's disease*". *J Neural Neuro surg psychiatry*. P.210-216.
8. Chong RK, Horak FB, 2000. "*Parkinson's disease impairs the ability to change set quickly*". *J Neurol sci*. P.57-70.
9. Taniwaki T, Okayama A, 2003. "*Reappraisal of the motor role of basal ganglia: a functional a magnetic resonance image study*". *J Neurosci*. P. 3432-3438.
10. Borleigh A, Horak FB, 1995. "*Levodopa reduces muscle tone and lower extremity tremor in parkinson's disease*. *Can J Neurol Sci*. P. 280-285.
11. Zias, Cody FWJ, 1998. "*Impairment of discrimination of bilateral differences in the lock of tactile stimuli in parkinson's disease*. *J physiol*. P.460-465.
12. Zias, Cody FWJ, 1998. "*Disturbance of human joint position sense in parkinson's disease*. *J Physiol* . P.180-181.
13. Horak FB, Nutt JG 1992. "*Postural inflexibility in parkinsonian subjects*.: *J Neurol Sci*. P. 46-58.
14. Mak MK, Worg EC, 2007. "*Quantitative measurement of trunk rigidity in parkinsonian patients*". *J Neurol*. P.202-209.
15. Vangoyeau M, Viallet F, 2006. "*axial rotation in parkinson's disease*". *J Neural Neurosurg psychiatry*. P.815-821.

CHAPTER XII

APPENDIX-I PATIENT PROFORMA

NAME :
AGE :
SEX :
OCCUPATION :
DATE OF ASSESSMENT :
CHIEF COMPLAINTS :
SUBJECTIVE :

a) Hi story

Present medical history

Past medical history

b) Surgical history

c) Drug history

d) Personal history

e) Family history

ON OBSERVATION

a) Built

b) Swelling

c) Soft tissue contours

VITAL SIGNS

a) Temperature

b) Blood pressure

c) Heart rate

d) Respiratory rate

EXAMINATION:

Higher functions

Mental status

Speech

Hearing Sensory system

Vision

Cranial nerves

Sensory system

sensation

Motor system

Reflexes

Co-ordination

Involuntary movements

Balance

Gait analysis

Hand function

Assistive devices

Functional assessment

PROBLEM LIST

MEANS

APPENDIX -II

PATIENT CONSENT FORM

**TITLE: AN APPROACH TO OVERCOME DELAYING MOBILITY
DISABILITY IN PEOPLE WITH PARKINSON'S DISEASE USING
SENSORY MOTOR AGILITY EXERCISE PROGRAM.**

INVESTIGATOR :

PURPOSE OF THE STUDY :

I -----,have been informed that this study will work towards achieving on functional activities of daily living in post stroke conditions for me and other patients.

PROCEDURE:

Each term of the study protocol has been explained to me in detail. I understand that during the procedure I will be receiving the treatment for one time a day. I understand that I will have to take this treatment for 16 weeks.

I understand that this will done under investigator-----
supervision. I am aware also that I have to follow therapist's instructions as told to me.

CONFIDENTIALITY :

I understand that medical information provided by this study will be confidential. If the data are used for publication in the medical literature or for teaching purposes, no names will be used and other literature such as audio or video tapes will be used only with permission.

RISK AND DISCOMFORT:

I understand that there are no potential risks associated with this procedure , and understand that investigator will accompany me during this procedure. There is no known hazards associated with this procedure.

REFUSAL OR WITHDRAWAL OF PARTICIPATION :

I understand that the decision my participation is wholly voluntary and I may refuse participate, may withdraw consent at any time during the study . I also understand that the investigator may terminate my participation in the study at any time after researcher has explained me the reasons to do so.

I have ----- explained the purpose of the research, the procedures required and the possible risks and benefits, to the best of my ability,! have read and understood this consent to participate we as a subject in this research project.

Signature of the witness :

DATE :

Signature of the patient:

APPENDIX – III

BERG BALANCE SCALE

The Berg Balance Scale (BBS) was developed to measure balance among older people with impairment in balance function by assessing the performance of functional tasks.

Description:

14-item scale designed to measure balance of the older adult in a clinical setting.

Equipment needed:

Ruler, two standard chairs (one with arm rests, one without), footstool or step, stopwatch or wristwatch, 15 ft walkway.

Completion:

Time: 15-20 minutes

Scoring: A five-point scale, ranging from 0-4. "0" indicates the lowest Level of function and "4" the highest level of function. Total Score = 56

Interpretation:

41-56 = low fall risk

21-40 = medium fall risk

0 -20 = high fall risk

GENERAL INSTRUCTIONS

Please document each task and/or give instructions as written. When scoring, please record the lowest response category that applies for each item.

In most items, the subject is asked to maintain a given position for a specific time. Progressively more points are deducted if:

- the time or distance requirements are not met
- the subject's performance warrants supervision
- the subject touches an external support or receives assistance from the examiner

Subject should understand that they must maintain their balance while attempting the tasks. The choices of which leg to stand on or how far to reach are left to the subject. Poor judgment will adversely influence the performance and the scoring. Equipment required for testing is a stopwatch or watch with a second hand, and a ruler or other indicator of 2, 5, and 10 inches. Chairs used during testing should be a reasonable height. Either a step or a stool of average step height may be used for item 12.

BERG BALANCE SCALE

SITTING TO STANDING

INSTRUCTIONS: Please stand up. Try not to use your hand for support

- () 4 able to stand without using hands and stabilize independently
- () 3 able to stand independently using hands
- () 2 able to stand using hands after several tries
- () 1 needs minimal aid to stand or stabilize
- () 0 needs moderate or maximal assist to stand

STANDING UNSUPPORTED

INSTRUCTIONS: Please stand for two minutes without holding on.

- () 4 able to stand safely for 2 minutes
- () 3 able to stand 2 minutes with supervision
- () 2 able to stand 30 seconds unsupported
- () 1 needs several tries to stand 30 seconds unsupported
- () 0 unable to stand 30 seconds unsupported

If a subject is able to stand 2 minutes unsupported, score full points for sitting unsupported. Proceed to item #4.

SITTING WITH BACK UNSUPPORTED BUT FEET SUPPORTED ON FLOOR OR ON A STOOL

INSTRUCTIONS: Please sit with arms folded for 2 minutes.

- () 4 able to sit safely and securely for 2 minutes
- () 3 able to sit 2 minutes under supervision
- () 2 able to sit 30 seconds
- () 1 able to sit 10 seconds
- () 0 unable to sit without support 10 seconds

STANDING TO SITTING

INSTRUCTIONS: Please sit down.

- () 4 sits safely with minimal use of hands
- () 3 controls descent by using hands
- () 2 uses back of legs against chair to control descent
- () I sits independently but has uncontrolled descent
- () 0 needs assist to sit

TRANSFERS

INSTRUCTIONS: Arrange chair(s) for pivot transfer. Ask subject to transfer one way toward a seat with armrests and one way toward a seat without armrests. You may use two chairs (one with and one without armrests) or a bed and a chair.

- () 4 able to transfer safely with minor use of hands
- () 3 able to transfer safely definite need of hands
- () 2 able to transfer with verbal cuing and/or supervision
- () I needs one person to assist
- () 0 needs two people to assist or supervise to be safe

STANDING UNSUPPORTED WITH EYES CLOSED

INSTRUCTIONS: Please close your eyes and stand still for 10 seconds.

- () 4 able to stand 10 seconds safely
- () 3 able to stand 10 seconds with supervision
- () 2 able to stand 3 seconds
- () I unable to keep eyes closed 3 seconds but stays safely
- () 0 needs help to keep from falling

STANDING UNSUPPORTED WITH FEET TOGETHER

INSTRUCTIONS: Place your feet together and stand without holding on.

- () 4 able to place feet together independently and stand 1 minute safely
- () 3 able to place feet together independently and stand 1 minute with supervision
- () 2 able to place feet together independently but unable to hold for 30 seconds
- () 1 needs help to attain position but able to stand 15 seconds feet together
- () 0 needs help to attain position and unable to hold for 15 seconds

REACHING FORWARD WITH OUTSTRETCHED ARM WHILE STANDING

INSTRUCTIONS: Lift arm to 90 degrees. Stretch out your fingers and reach forward as far as you can. (Examiner places a ruler at the end of fingertips when arm is at 90 degrees. Fingers should not touch the ruler while reaching forward. The recorded measure is the distance forward that the fingers reach while the subject is in the most forward lean position. When possible, ask subject to use both arms when reaching to avoid rotation of the trunk.)

- () 4 can reach forward confidently 25 cm (10 inches)
- () 3 can reach forward 12 cm (5 inches)
- () 2 can reach forward 5 cm (2 inches)
- () 1 reaches forward but needs supervision
- () 0 loses balance while trying/requires external support

PICK UP OBJECT FROM THE FLOOR FROM A STANDING POSITION

INSTRUCTIONS: Pick up the shoe/slipper, which is in front of your feet.

- () 4 able to pick up slipper safely and easily
- () 3 able to pick up slipper but needs supervision
- () 2 unable to pick up but reaches 2-5 cm(1-2 inches) from slipper and keeps balance independently
- () I unable to pick up and needs supervision while trying
- () 0 unable to try/needs assist to keep from losing balance or falling

TURNING TO LOOK BEHIND OVER LEFT AND RIGHT SHOULDERS WHILE STANDING

INSTRUCTIONS: Turn to look directly behind you over toward the left shoulder. Repeat to the right. (Examiner may pick an object to look at directly behind the subject to encourage a better twist turn.)

- () 4 looks behind from both sides and weight shifts well
- () 3 looks behind one side only other side shows less weight shift
- () 2 turns sideways only but maintains balance
- () I needs supervision when turning
- () 0 needs assist to keep from losing balance or falling

TURN 360 DEGREES

INSTRUCTIONS: Turn completely around in a full circle. Pause, Then turn a full circle in the other direction.

- () 4 able to turn 360 degrees safely in 4 seconds or less
- () 3 able to turn 360 degrees safely one side only 4 seconds or less
- () 2 able to turn 360 degrees safely but slowly
- () I needs close supervision or verbal cuing
- () 0 needs assistance while turning

PLACE ALTERNATE FOOT ON STEP OR STOOL WHILE STANDING UNSUPPORTED

INSTRUCTIONS: Place each foot alternately on the step/stool. Continue until each foot has touched the step/stool four times.

- () 4 able to stand independently and safely and complete 8 steps in 20 Seconds
- () 3 able to stand independently and complete 8 steps in > 20 seconds
- () 2 able to complete 4 steps without aid with supervision
- () 1 able to complete > 2 steps needs minimal assist
- () 0 needs assistance to keep from falling/unable to try

STANDING UNSUPPORTED ONE FOOT IN FRONT

INSTRUCTIONS: (DEMONSTRATE TO SUBJECT) Place one foot directly in front of the other. If you feel that you cannot place your foot directly in front, try to step far enough ahead that the heel of your forward foot is ahead of the toes of the other foot. (To score 3 points, the length of the step should exceed the length of the other foot and the width of the stance should approximate the subject's normal stride width.)

- () 4 able to place foot tandem independently and hold 30 seconds
- () 3 able to place foot ahead independently and hold 30 seconds
- () 2 able to take small step independently and hold 30 seconds
- () 1 needs help to step but can hold 15 seconds
- () 0 loses balance while stepping or standing

STANDING ON ONE LEG

INSTRUCTIONS: Stand on one leg as long as you can without holding on.

- () 4 able to lift leg independently and hold > 10 seconds
- () 3 able to lift leg independently and hold 5-10 seconds
- () 2 able to lift leg independently and hold 5 3 seconds
- () 1 tries to lift leg unable to hold 3 seconds but remains standing independently.
- () 0 unable to try of needs assist to prevent fall
- () TOTAL SCORE (Maximum = 56)

APPENDIX -IV

TIMED GET UP AND GO TEST

Measures mobility in people who are able to walk on their own (assistive device permitted)

Instructions:

The person may wear their usual footwear and can use any assistive device they normally use.

1. Have the person sit in the chair with their back to the chair and their arms resting on the arm rests.
2. Ask the person to stand up from a standard chair and walk a distance of 10 ft. (3m).
3. Have the person turn around, walk back to the chair and sit down again. Timing begins when the person starts to rise from the chair and ends when he or she returns to the chair and sits down.

The person should be given 1 practice trial and then Sactual trial. The times from the three actual trials are averaged.

Predictive Results

Seconds	Rating
<10	Freely mobile
<20	Mostly independent
20-29	Variable mobility
>20	Impaired mobility

DISSERTATION ENTITLED

**AN APPROACH TO OVERCOME DELAYING MOBILITY DISABILITY IN
PEOPLE WITH PARKINSON'S DISEASE USING SENSORY MOTOR
AGILITY EXERCISE PROGRAM**

Submitted by

Reg No. 27102318

Under the guidance of

Asso. Prof. Mrs. UMA, M.P.T (Neuro)., MIAP.

Dissertation submitted to

**THE TAMILNADU Dr. M.G.R.MEDICAL UNIVERSITY,
CHENNAI-32.**

Dissertation evaluated on -----

Internal Examiner

External Examiner

CERTIFICATE I

This is to certify that the dissertation entitled **AN APPROACH TO OVERCOME DELAYING MOBILITY DISABILITY IN PEOPLE WITH PARKINSON'S DISEASE USING SENSORY MOTOR AGILITY EXERCISE PROGRAM** was carried out by **Reg.No.27102318** P.P.G College of physiotherapy, Coimbatore-35, affiliated to the Tamilnadu Dr.M.G.R.Medical University, Chennai-32, under the guidance of **Asso.Prof.UMA, M.P.T (Neuro)., MIAP**

Prof. K.RAJA SENTHIL, M.P.T (Cardio-Resp)., MIAP., Ph.d

Principal

CERTIFICATE II

This is to certify that the dissertation entitled **AN APPROACH TO OVERCOME DELAYING MOBILITY DISABILITY IN PEOPLE WITH PARKINSON'S DISEASE USING SENSORY MOTOR AGILITY EXERCISE PROGRAM** was carried out by **Reg.No.27102318** P.P.G.College of physiotherapy, Coimbatore-35, affiliated to the Tamilnadu Dr.M.G.R Medical University, Chennai-32, under my guidance and direct supervision.

Asso. Prof. UMA, M.P.T (Neuro),MIAP.,

Professor

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ABSTRACT

SUBJECT OBJECTIVE:

It is an experimental study design to determine an approach to overcome delaying mobility disability in people with parkinson's disease using sensory motor agility exercise program.

DESIGN:

The study was pre-test and post test experimental group design.

PARTICIPANTS:

A sample of 20 parkinson's disease patients were divided into 2 groups

Group A:

Experimental group: Treated with sensory motor agility exercise.

Group B:

Control group: Treated with traditional gait training program.

OUTCOME MEASURES:

Delaying mobility disability in parkinsons disease patients was measured using Berg balance scale and timed up and go test.

Results:

Statically group A was significant when compared to group B which received sensory motor agility exercise.

CONCLUSION:

This study concludes that sensory motor agility exercise beneficial in improving delaying mobility disability in people with parkinson's disease. Thus this study accepts the alternate hypothesis.